SUDHARSAN ENGINEERING COLLEGE
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Sathiyamangalam, Kulathur(TK), Pudukkottai District-622 501
Ph: 04339-240830, 240840 Fax: 04339-240205
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E-Box Colleges

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

As per Anna University Regulation 2017, the list of courses for the batch 2019 - 2023 is given in the Table.

S. No	COURSE CODE	COURSE CODE (AU)	COURSE NAME
		Semester I	
1.	C101	HS8151	COMMUNICATIVE ENGLISH
2.	C102	MA8151	ENGINEERING MATHEMATICS – I
3.	C103	PH8151	ENGINEERING PHYSICS
4.	C104	CY8151	ENGINEERING CHEMISTRY
5.	C105	GE8151	PROBLEM SOLVING AND PYTHON PROGRAMMING
6.	C106	GE8152	ENGINEERING GRAPHICS
7.	C107	GE8161	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
8.	C108	BS8161	PHYSICS AND CHEMISTRY LABORATORY

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Semester II			
9.	C109	HS8251	TECHNICAL ENGLISH
10.	C110	MA8251	ENGINEERING MATHEMATICS - II
11.	C111	PH8253	PHYSICS FOR ELECTRONICS ENGINEERING
12.	C112	BE8252	BASIC CIVIL AND MECHANICAL ENGINEERING
13.	C113	EE8251	CIRCUIT THEORY
14.	C114	GE8291	ENVIRONMENTAL SCIENCE AND ENGINEERING
15.	C115	GE8261	ENGINEERING PRACTICES LABORATORY
16.	C116	EE8261	ELECTRIC CIRCUITS LABORATORY
Semester III			
17.	C201	MA8353	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS
18.	C202	EE8351	DIGITAL LOGIC CIRCUITS
19.	C203	EE8391	ELECTROMAGNETIC THEORY
20.	C204	EE8301	ELECTRICAL MACHINES – I
21.	C205	EC8353	ELECTRON DEVICES AND CIRCUITS

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22.	C206	ME8792	POWER PLANT ENGINEERING
23.	C207	EC8311	ELECTRONICS LABORATORY
24.	C208	EE8311	ELECTRICAL MACHINES LABORATORY – I
Semester IV			
25.	C209	MA8491	NUMERICAL METHODS
26.	C210	EE8401	ELECTRICAL MACHINES – II
27.	C211	EE8402	TRANSMISSION AND DISTRIBUTION
28.	C212	EE8403	MEASUREMENTS AND INSTRUMENTATION
29.	C213	EE8451	LINEAR INTEGRATED CIRCUITS AND APPLICATIONS
30.	C214	IC8451	CONTROL SYSTEMS
31.	C215	EE8411	ELECTRICAL MACHINES LABORATORY - II
32.	C216	EE8461	LINEAR AND DIGITAL INTEGRATED CIRCUITS LABORATORY
33.	C217	EE8412	TECHNICAL SEMINAR
Semester V			

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34.	C301	EE8501	POWER SYSTEM ANALYSIS
35.	C302	EE8551	MICROPROCESSORS AND MICROCONTROLLERS
36.	C303	EE8552	POWER ELECTRONICS
37.	C304	EE8591	DIGITAL SIGNAL PROCESSING
38.	C305	CS8392	OBJECT ORIENTED PROGRAMMING
39.	C306	OAN551	SENSORS AND TRANSDUCERS
40.	C307	EE8511	CONTROL AND INSTRUMENTATION LABORATORY
41.	C308	HS8581	PROFESSIONAL COMMUNICATION
42.	C309	CS8383	OBJECT ORIENTED PROGRAMMING LABORATORY
Semester VI			
43.	C310	EE8601	SOLID STATE DRIVES
44.	C311	EE8602	PROTECTION AND SWITCHGEAR
45.	C312	EE8691	EMBEDDED SYSTEMS
46.	C313	EE8004	MODERN POWER CONVERTERS

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47.	C314	EE8006	POWER QUALITY
48.	C315	EE8661	POWER ELECTRONICS AND DRIVES LABORATORY
49.	C316	EE8681	MICROPROCESSORS AND MICROCONTROLLERS LABORATORY
50.	C317	EE8611	MINI PROJECT
Semester VII			
51.	C401	EE8701	HIGH VOLTAGE ENGINEERING
52.	C402	EE8702	POWER SYSTEM OPERATION AND CONTROL
53.	C403	EE8703	RENEWABLE ENERGY SYSTEMS

54.	C404	GE8071	DISASTER MANAGEMENT
55.	C405	OCS752	INTRODUCTION TO C PROGRAMMING
56.	C406	EE8010	POWER SYSTEMS TRANSIENTS
57.	C407	EE8711	POWER SYSTEM SIMULATION LABORATORY
58.	C408	EE8712	RENEWABLE ENERGY SYSTEMS LABORATORY
Semester VIII			

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59.	C409	MG8591	PRINCIPLES OF MANAGEMENT
60.	C410	EI8073	BIOMEDICAL INSTRUMENTATION
61.	C411	EE8811	PROJECT WORK

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E-Box Colleges

SEMESTER 1

COURSE CODE & NAME : C101 & COMMUNICATIVE ENGLISH		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C101.1	**Enhance** their reading and technical writing skills in the first year itself	K2
C101.2	**Comfortably** read and understand articles in science and Engineering journals and articles in dailies	K2
C101.3	Get themselves **involved** in an active manner during informal conversations, state opinions and express willingness	K3
C101.4	**Communicate** effectively in short conversations and talks uttered in English	K4
C101.5	**Draft** essays related to their subjects and write personal letters and emails in comfortable manner for lifelong learning	K4

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COURSE CODE & NAME : C102 & ENGINEERING MATHEMATICS – I		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C102.1	**Analyze** and apply the Engineering knowledge in differentiation to solve maxima and minima problems.	K4
C102.2	**Solve** the problems of integrals using different methods of calculus.	K5
C102.3	**Design** and **develop** the problems of integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.	K6
C102.4	**Analyze** the problems of integrals by using various methods of integration, such as substitution, partial fractions and integration by parts.	K4
C102.5	**Apply** various tools in solving the differential equations to recognize the need for life-long learning.	K3

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COURSE CODE & NAME : C103 & ENGINEERING PHYSICS		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C103.1	**Analyse** the problems in columns and beams and gain the engineering knowledge in properties of matter to formulate.	**K4**
C103.2	**Understand** the fundamental concepts and applications of waves, lasers and fiber optics to give theoretical approaches to design modern devices.	**K2**
C103.3	**Interpret** the knowledge in thermal properties of materials and can determined expansion joints and heat exchangers in devices.	**K3**
C103.4	**Understand** the fundamental concepts of quantum theory and how modern electron microscope techniques use it to make predictions in the field of physics.	**K2**
C103.5	**Describe** the behaviour of solids, describe the fundamentals of crystals, their structures, and the various crystal development processes.	**K2**

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COURSE CODE & NAME : C104 & ENGINEERING CHEMISTRY		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C104.1	**Apply** the water treatment techniques water in the industries and domestic water using the latest techniques by using engineering knowledge.	K3
C104.2	**Understand** the adsorption methods used in the field of water and air pollution purification to assess societal, health, safety and cultural issues in the environmental.	K2
C104.3	**Know** the significance of alloying and the behaviour of one component and two component systems using phase diagram and apply appropriate techniques in the field of metallurgy.	K2
C104.4	**Discuss** the types of fuels, calorific value calculations, and analyze the need for alternative fuels to solve current social problems by using engineering techniques.	K4
C104.5	**Review** the principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells with appropriate consideration for the societal and environmental considerations.	K2

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COURSE CODE & NAME : C105 & PROBLEM SOLVING AND PYTHON PROGRAMMING		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C105.1	**Understand** the concepts of computational thinking and algorithmic problem-solving techniques	**K2**
C105.2	**Develop** simple python programs for applying the concepts of data types, expressions, and python statements	**K3**
C105.3	**Develop** Python programs for solving real-time computational problems by using conditionals, looping, functions, and strings.	**K3**
C105.4	**Understand** the concepts of compound data using Python lists, tuples, and dictionaries	**K2**
C105.5	**Develop** python programs for solving computational problems by using modules, files, and python packages	**K3**

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COURSE CODE & NAME : C106 & ENGINEERING GRAPHICS		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C106.1	**Sketch** the conic sections, special curves, and draw orthographic views from pictorial views and models.	**K4**
C106.2	**Apply** the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.	**K3**
C106.3	**Sketch** the projections of simple solids like prisms, pyramids, cylinder and cone and obtain the traces of plane figures.	**K4**
C106.4	**Practice** the sectional views of solids like cube, prisms, pyramids, cylinders & cones and extend its lateral surfaces	**K3**
C106.5	**Sketch** the perspective projection of simple solids, truncated prisms, pyramids, cone and cylinders and sketch the isometric projection of simple machine parts.	**K4**

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COURSE CODE & NAME : C107 & PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C107.1	**Develop** simple python programs for applying the concepts of data types, expressions, and python statements	**K3**
C107.2	**Develop** Python programs using conditionals, looping, functions, and strings for solving real-time computational problems.	**K3**
C107.3	**Understand** the concepts of compound data using Python lists, tuples, and dictionaries	**K2**
C107.4	**Develop** python programs for solving problems by using modules, files, and python packages	**K3**
C107.5	**Utilize** Python packages for developing real-world software applications	**K6**

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COURSE CODE & NAME : C108 & PHYSICS AND CHEMISTRY LABORATORY		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C108.1	**Manipulate** the fundamental concepts like torque, elasticity and bending moment of beams for various engineering applications by the determination of rigidity modulus of the wire and young's modulus of the material of the beam by non-uniform bending.	K3
C108.2	**Practice** the fundamentals of thermal properties of material of the bad conductor by Lee's disc method.	K3
C108.3	**Understand** the basic knowledge and estimation of DO content in water sample by Winkler's method and molecular weight of polymer by Ostwald viscometer	K2
C108.4	**Dramatize** the strength of an acid using pH meter and conduct meter for applications in the field of engineering.	K3
C108.5	**Experimenting** the estimation of total, permanent and temporary hardness of water for our environment,	K3

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SEMESTER 2

COURSE CODE & NAME : C109 & TECHNICAL ENGLISH		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C109.1	**Read and write** their technical and area-specific texts in an effortless manner	**K3**
C109.2	**Listen** comfortably and respond confidently to lectures and talks pertaining to their domain skills	**K2**
C109.3	**Speak** in an appropriate manner in both formal and informal situations for lifelong learning	**K3**
C109.4	**Create** CVs and draft Job applications in confident manner	**K6**
C109.5	**Communicate** confidently by using all the four skills with their peers and in real life situations	**K4**

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COURSE CODE & NAME : C110 & ENGINEERING MATHEMATICS - II		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C110.1	**Analyze** the different types of matrices for solving practical problems.	**K4**
C110.2	**Apply** Gradient, divergence and curl of a vector point function and related identities in engineering field.	**K3**
C110.3	**Acquire** the knowledge to solve the engineering problems in analytic functions	**K2**
C110.4	**Analyze** and **apply** the different methods to solve complex integration problems.	**K4**
C110.5	**Create** and manage the projects after applying and analysing the fundamentals of Laplace transforms	**K6**

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COURSE CODE & NAME : C111 & PHYSICS FOR ELECTRONICS ENGINEERING		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C111.1	**Comprehend** the materials for their diverse applications, it is necessary to grasp the energy band structures and the classical and quantum electron theories.	**K3**
C111.2	**Provide** a balanced understanding of diverse semiconductor electronic devices, such as hall devices, ohmic contacts, schottky diodes, and power transistors, by explaining the fundamental principles of semiconductor physics.	**K2**
C111.3	**Interpret** the properties of magnetic and dielectric materials, manipulate them and then analyze them for the purposes for which they are used in modern devices.	**K3**
C111.4	**Understand** the fundamental properties of optical materials in optoelectronics which is essential to comprehend the theoretical methods for designing modern optoelectronic devices.	**K2**
C111.5	**Comprehend** the fundamentals of quantum structures and the Nano scale manipulation of modern materials in spintronics and carbon electronics.	**K2**

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COURSE CODE & NAME: C112 & BASIC CIVIL AND MECHANICAL ENGINEERING		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C112.1	**Appreciate** the Civil and Mechanical Engineering components of Projects	K2
C112.2	**Measure** distances and area by surveying	K3
C112.3	**Explain** the usage of construction material and proper selection of construction materials.	K3
C112.4	**Identify** the components used in power plant cycle, demonstrate working principles of petrol and diesel engine.	K2
C112.5	**Elaborate** the components of refrigeration and Air conditioning cycle.	K2

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COURSE CODE & NAME: C113 & CIRCUIT THEORY		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C113.1	**Apply** Kirchhoff's current and voltage laws to simple circuits and Solve complex circuits using Mesh & Nodal Methods.	K3
C113.2	**Apply** Network theorems to linear circuits and to solve simple and complex problems.	K3
C113.3	**Analyze** the Transient response of RLC circuits under DC and AC excitation using Laplace Transform	K4
C113.4	**Analyze** three phase balanced and unbalanced star, delta network	K4
C113.5	**Compute** the frequency response of Series and Parallel resonance and analyze tuned circuits.	K2

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COURSE CODE & NAME : C114 & ENVIRONMENTAL SCIENCE AND ENGINEERING		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C114.1	**Apply the** finding and implementing scientific, technological, economic and political solutions to environmental problems with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	K3
C114.2	**Understand the** impact of the professional engineering solutions in societal and environmental contexts for the importance of public participation in conservation of natural resources.	K2
C114.3	**Discuss** the types of natural energy sources and analyze the need for alternative fuels to solve current social problems by using engineering techniques.	K2
C114.4	**Learning** the concepts from unsustainable to sustainable development and urban problems related to energy, water conservation, rain water harvesting.	K2
C114.5	**Apply** the basics of information technology in environment and human health function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	K3

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COURSE CODE & NAME : C115 & ENGINEERING PRACTICES LABORATORY		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C115.1	**Fabricate** carpentry joints	K6
C115.2	**Use** Welding equipment's to join the structures	K3
C115.3	**Perform** sheet metal works	K6
C115.4	**Perform** basic fitting operations and plumbing	K3
C115.5	**Carry out** basic home electrical works and appliances.	K3

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COURSE CODE & NAME : C116 & ELECTRIC CIRCUITS LABORATORY		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C116.1	**Solve** the circuit problems using laws and theorem concepts.	K6
C116.2	**Simulate** electrical circuits and to experimentally verify various theorems for circuit designing purposes.	K5
C116.3	**Experiment** the frequency response and transients in passive elements.	K4
C116.4	**Simulate** the resonance circuits for several applications such as designing of tuning circuit, signal processing and voltage magnification.	K5
C116.5	Make the **simulation** of three phase circuits using suitable simulation for both balanced and unbalanced condition.	K6

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SEMESTER 3

COURSE CODE & NAME : C201 & TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C201.1	**Understand** to solve the given standard partial differential equations.	K2
C201.2	**Identify** and analyze the differential equations using Fourier series analysis in engineering applications.	K4
C201.3	**Create** using modern techniques of Fourier series to solve one- and two-dimensional heat flow problems and one-dimensional wave equations.	K5
C201.4	**Apply** the engineering knowledge to manage the projects in transforms and partial differential equations to formulate and solve some of the physical engineering problems.	K6
C201.5	**Use** the effective modern mathematical tools to solve the partial differential equations by using Z transform techniques for discrete time systems.	K3

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COURSE CODE & NAME : C202 & DIGITAL LOGIC CIRCUITS		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C202.1	**Understand** the various number systems and study the characteristics of the digital logic family circuits	K2
C202.2	**Apply** the Boolean functions, K maps and implementation of combinational logic circuits.	K3
C202.3	**Analyze** the various synchronous and asynchronous sequential circuits.	K4
C202.4	**Implement** Boolean logic equations with Programmable logic Devices	K3
C202.5	**Develop** VHDL code for combinational and Sequential Logic Circuits	K3

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COURSE CODE & NAME : C203 & ELECTROMAGNETIC THEORY		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C203.1	**Comprehend** the basic mathematical concepts related to vector calculus, coordinate system, Gauss's law and applications.	K2
C203.2	**Realize** the concepts of electrical potential and apply the boundary conditions and their application	K3
C203.3	**Develop** the concepts of magneto statics and apply the boundary conditions and their application.	K3
C203.4	**Understand** the concepts of Faradays law, induced emf and Maxwell's equations to study the electrodynamics fields.	K2
C203.5	**Examine** the basic fundamental concepts of electromagnetic waves, parameters and systems.	K4

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COURSE CODE & NAME : C204 & ELECTRICAL MACHINES – I		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C204.1	**Comprehend** the fundamental laws in the magnetic circuits and its performance for all electrical machines.	K2
C204.2	**Explore** the equivalent circuit of transformers at different loading condition and apply the voltage regulation and efficiency	K3
C204.3	**Interpret** the electric and magnetic field interactions in electromechanical devices and machines	K2
C204.4	**Understand** the DC machines based on their type of excitation	K2
C204.5	**Acquire** the type of speed control of DC motor in different application	K3

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COURSE CODE & NAME : C205 & ELECTRON DEVICES AND CIRCUITS		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C205.1	**Explain** the basic structure and operation of basic electronic devices such and its characteristics.	K2
C205.2	**Illustrate** the basic function and working of various electronic devices such as transistors and thyristors.	K2
C205.3	**Choose** the various modes of operation in gain and frequency response and small signal amplifier circuits	K2
C205.4	**Perform** the different stages of amplifier, differential amplifier cascade amplifier and power amplifier	K2
C205.5	**Understand** the parameters of feedback amplifiers and oscillator circuits.	K2

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COURSE CODE & NAME : C206 & POWER PLANT ENGINEERING		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C206.1	**Describe** the modern coal-based power plant and components used in thermal plant.	K2
C206.2	**Explain** the fundamental of various cycles and diesel, gas and combined cycle power plant.	K2
C206.3	**Discuss** the layout and working of various Nuclear Power Plants	K2
C206.4	**Understand** the construction and working of hydroelectric and various non-conventional power plants.	K2
C206.5	**Analyze** energy, economic and environmental issues of power plant.	K4

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COURSE CODE & NAME : C207 & ELECTRONICS LABORATORY		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C207.1	**Understand** the fundamental operation and characteristics of semiconductor devices.	K2
C207.2	**Formulate** the basic parameters of semiconductor devices and their limiting factors.	K3
C207.3	**Apply** the BJT amplifiers in various configuration techniques.	K3
C207.4	**Design** the frequency response characteristics of amplifiers	K4
C207.5	**Design** the basic electronic circuits with application to diodes, field-effect transistors and bipolar junction transistors.	K4

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COURSE CODE & NAME : C208 & ELECTRICAL MACHINES LABORATORY – I		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C208.1	**Analyze** the performance of various D.C. Generators and understand its applications.	K4
C208.2	**Analyze** the operation of D.C. Generators and D.C motor on no load and load condition.	K4
C208.3	**Analyze** the performance characteristics of various D.C. Motors and understand its applications.	K4
C208.4	**Analyze** the performance of DC motor by conducting suitable tests	K4
C208.5	**Evaluate** the voltage regulation and predetermine the performance of the single phase and three phase transformers.	K5

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SEMESTER 4

COURSE CODE & NAME : C209 & NUMERICAL METHODS		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C209.1	**To apply** the fundamental techniques of solving algebraic and transcendental equations.	**K4**
C209.2	**To apply** the numerical techniques of interpolation and error approximations in various intervals in real life situations.	**K3**
C209.3	**To apply** the engineering knowledge to solve the differentiation and integration problems.	**K3**
C209.4	**To identify** and **apply** the modern tools for solving first and second order ordinary differential equations.	**K4**
C209.5	**To identify** the problem and solve the partial and ordinary differential equations with initial and boundary conditions by using modern tools for project management.	**K6**

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COURSE CODE & NAME : C210 & ELECTRICAL MACHINES – II		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C210.1	**Analyze** the performance of salient and non-salient pole synchronous generator of construction, working principle.	K4
C210.2	**Understand** the concept, principle and the performance of synchronous motor.	K4
C210.3	**Illustrate** the construction, working principle and performance of three phase induction motor and its types.	K2
C210.4	**Analyze** the different types of starters and speed control methods of three phase induction motor.	K4
C210.5	**Understand** the construction, principle and **analyze** the performance of single-phase induction motors and special electrical machines.	K4

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COURSE CODE & NAME : C211 & TRANSMISSION AND DISTRIBUTION		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C211.1	**Design** the transmission line parameters for specific performance and estimate the voltage drop.	K4
C211.2	**Design** equivalent circuits for the transmission lines based on distance and to calculate the voltage regulation and efficiency for public safety.	K3
C211.3	**Analyze** the **design** of transmission lines insulator rings and to improve the efficiency.	K4
C211.4	**Explain** the types of cables and the methods of grading of cables	K3
C211.5	**Describe** the distribution systems, substations, groundings, fundamentals of EHVAC, HVDC and FACTS systems.	K3

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COURSE CODE & NAME : C212 & MEASUREMENTS AND INSTRUMENTATION		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C212.1	**Acquire** the basic knowledge on functional elements of instruments and errors in measurement system.	K2
C212.2	**Explain** the suitable instrument for measuring electrical and electronics parameters.	K2
C212.3	**Apply** a suitable bridge circuit used for measuring different electrical quantities.	K3
C212.4	**Understand** the construction, operating principles of different storage and display devices.	K2
C212.5	**Apply** the concepts and operational features of transducer and Data Acquisition System.	K3

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COURSE CODE & NAME : C213 & LINEAR INTEGRATED CIRCUITS AND APPLICATIONS		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C213.1	Know the **fundamental** knowledge in IC fabrication procedure.	K2
C213.2	**Understand** the characteristics of op-amps and signal analysis using op-amp.	K2
C213.3	**Understand** the importance of signal analysis and applications of op-amp based circuits.	K2
C213.4	**Understand** the functional blocks and the applications of special ICs like timers, PLL circuits	K2
C213.5	**Understand** the operation of application ICs like voltage regulator and switching regulator.	K2

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COURSE CODE & NAME : C214 & CONTROL SYSTEMS		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C214.1	**Apply** the transfer function models for analysis of physical system and control system components.	K3
C214.2	**Analyze** the time response of various linear systems and steady state errors.	K4
C214.3	**Apply** the frequency response of the system in open and closed loop response.	K3
C214.4	**Apply** the concepts of system stability to analyze performance of closed loop systems.	K3
C214.5	**Apply** the basic concepts of state variable analysis of systems and effect of state feedback of system	K3

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COURSE CODE & NAME : C215 & ELECTRICAL MACHINES LABORATORY - II		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C215.1	**Analyze** the regulation of Alternators by EMF, MMF and ZPF Methods	K4
C215.2	**Analyze** the Characteristics of synchronous motor using V and inverted V curve	K4
C215.3	**Analyze** the separation of losses in Induction Motor	K4
C215.4	**Analyze** the efficiency and performance characteristics of single phase induction motor	K4
C215.5	**Analyze** the efficiency and performance characteristics of three phase induction motor	K4

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COURSE CODE & NAME : C216 & LINEAR AND DIGITAL INTEGRATED CIRCUITS LABORATORY		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C216.1	**Evaluate** the boolean functions and develop adder, subtractor circuits	K5
C216.2	**Analyze** the various code converters to understand the importance of code conversion.	K4
C216.3	**Analyze** and implement 4-bit Shift Registers	K4
C216.4	**Develop** Op-Amp in various application circuits	K3
C216.5	**Formulate** the counters using specific counter IC.	K2

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COURSE CODE & NAME : C217 & TECHNICAL SEMINAR		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C217.1	**Understand** the effective and recent advancement presentation on Engineering & technology	K2
C217.2	**Apply** and prepare the State-of-art technologies in the present-day technological growths.	K3
C217.3	**Formulate** the presentation using the concepts of ordering and determining the central, main and supporting ideas	K2
C217.4	**Present** any topic in any recent advancement with good communicative skill infront of peers and faculty members	K3
C217.5	**Perform** well in placement recruitment drive with good technical skills and communication skills	K2

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SEMESTER 5

COURSE CODE & NAME : C301 & POWER SYSTEM ANALYSIS		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C301.1	**Classify** the power system components and per unit values under steady state operating condition.	K2
C301.2	**Apply** the power flow solution for power system problem by GS and NR techniques.	K3
C301.3	**Apply** the Thevenin's theorem and bus impedance matrix for power system under symmetrical fault conditions.	K3
C301.4	**Analyze** the power system network under L-L and L-L-G fault condition using symmetrical components.	K4
C301.5	**Analyze** the power system stability using equal area criterion and to modified Euler's methods to solve the swing equation	K4

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COURSE CODE & NAME : C302 & MICROPROCESSORS AND MICROCONTROLLERS		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C302.1	**Describe** the architecture and working of 8085 with timing diagram.	K2
C302.2	**Describe** and implement the different instructions using addressing modes.	K2
C302.3	**Understand** the architecture and working of various blocks with timing diagram in 8081 microcontrollers.	K2
C302.4	**Understand** the various peripherals interfaced with 8085 microprocessors.	K2
C302.5	**Apply** the basic knowledge of microcontroller programming and its different applications.	K3

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COURSE CODE & NAME : C303 & POWER ELECTRONICS		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C303.1	**Describe** the types of semiconductor devices and their switching characteristics.	K2
C303.2	**Analyze** the various AC to DC converters.	K4
C303.3	**Sketch** the fundamental switching topologies of DC-to-DC converters and their applications.	K3
C303.4	**Interpret** the modulation and harmonic reduction techniques in DC to AC Converters.	K3
C303.5	**Illustrate** the operation of AC voltage controller and to implement cyclo converter design for their applications.	K2

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COURSE CODE & NAME : C304 & DIGITAL SIGNAL PROCESSING		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C304.1	**Analyze** the various types of signal and systems, sampling in time signal.	K4
C304.2	**Understand** and **apply** discrete time Linear Time Invariant systems using Z transform and Discrete Time Fourier Transform.	K3
C304.3	**Apply** the concepts of Discrete Fourier Transform and Fast Fourier Transform to solve Problems	K3
C304.4	**Apply** Finite impulse response and Infinite impulse response digital filters.	K3
C304.5	**Understand** the various types of architecture of digital signal processors.	K2

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COURSE CODE & NAME : C305 & OBJECT ORIENTED PROGRAMMING		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C305.1	**Design** and implement java simple application that make use of classes, packages and interfaces	K2
C305.2	**Develop** a java application using class and its members and also implement java converter applications.	K4
C305.3	**Apply** the java string programs using string operations using array list, abstract classes	K4
C305.4	**Develop** a java program to implement user defined exceptions, reading and writing a file	K4
C305.5	**Develop** a java program for multi-threaded applications and generic function.	K4

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COURSE CODE & NAME : C306 & SENSORS AND TRANSDUCERS		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C306.1	**Expertise** in various calibration techniques and signal types for sensors	K2
C306.2	**Apply** the various sensors in the Automotive applications	K3
C306.3	**Apply** the various sensors in the Mechatronics applications	K3
C306.4	**Study** the basic principles of various smart sensors	K2
C306.5	**Implement** the DAQ systems with different sensors for real time applications	K5

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COURSE CODE & NAME : C307 & CONTROL AND INSTRUMENTATION LABORATORY		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C307.1	**Analyze** the characteristics of P, PI and PID controllers experimentally and analyze the stability of the control system using MATLAB	K4
C307.2	**Analyze** the various types of ADC, DAC converters.	K4
C307.3	**Analyze** the response of lag, lead and lag-lead compensators.	K4
C307.4	**Analyze** the basics of bridge networks and signal conditioning circuits.	K4
C307.5	**Analyze** the response and stability of control systems using simulation package.	K4

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COURSE CODE & NAME : C308 & PROFESSIONAL COMMUNICATION		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C308.1	**Enhance** the employability and career skills in engineering domain	**K3**
C308.2	**Improve** professional communication	**K4**
C308.3	**Build** confidence in employability skills	**K4**
C308.4	**Face** interviews with necessary skills	**K5**
C308.5	**Acquire** required skills to excel in their career	**K3**

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COURSE CODE & NAME : C309 & OBJECT ORIENTED PROGRAMMING LABORATORY		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C309.1	**Design** and implement java simple application that make use of classes, packages and interfaces	K2
C309.2	**Develop** a java application using class and its members and also implement java converter applications.	K4
C309.3	**Apply** the java string programs using string operations using array list, abstract classes	K4
C309.4	**Develop** a java program to implement user defined exceptions, reading and writing a file	K4
C309.5	**Develop** a java program for multi-threaded applications and generic function.	K4

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COURSE CODE & NAME : C310 & SOLID STATE DRIVES		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C310.1	**Explain** the fundamental of steady state and dynamics of a drive system.	K2
C310.2	**Illustrate** the operation of the converter / chopper fed dc drive to solve simple problems	K3
C310.3	**Demonstrate** the operation of classical and modern induction motor drives	K3
C310.4	**Analyze** the operation and performance of synchronous motor drives.	K4
C310.5	**Design** the current and speed controllers for a closed loop solid-state DC motor drive.	K3

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COURSE CODE & NAME : C311 & PROTECTION AND SWITCHGEAR		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C311.1	**Comprehend** the fundamental knowledge on various faults and protective schemes in power system.	K2
C311.2	**Assimilate** the various electromagnetic relays and its application	K2
C311.3	**Choose** the protection scheme for various faults in motor, generator, transformer, bus bar, transmission line	K2
C311.4	**Know** the various static relays and numerical relays and its application	K2
C311.5	**Understand** the concepts and principle of various circuit breakers	K2

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COURSE CODE & NAME : C312 & EMBEDDED SYSTEMS		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C312.1	**Explain** the building process and hardware, software tools in embedded systems.	K2
C312.2	**Analyze** the types if I/O device ports, bus and relate processor in embedded system.	K4
C312.3	**Apply** the embedded development strategies to develop the embedded firmware environment.	K3
C312.4	**Comprehend** the fundamental concepts of various techniques in Real Time Operating System.	K2
C312.5	**Apply** the knowledge of concepts of embedded system for various applications such as economic, environmental and society.	K3

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COURSE CODE & NAME : C313 & MODERN POWER CONVERTERS		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C313.1	**Understand** the concepts of Switched mode DC power supplies.	K2
C313.2	**Know** the operation of phase Controlled Rectifiers and apply the inverters and essentiality of harmonic control in power electronic circuits.	K3
C313.3	**Apply** the AC-AC converters with and without DC link harmonic control in power electronic circuits.	K3
C313.4	**Understand** the concepts of ZVS, ZCS, Quasi resonant converters.	K2
C313.5	**Apply** the converters for AC-DC conversion and SMPS	K3

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COURSE CODE & NAME : C314 & POWER QUALITY		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C314.1	**Understand** various sources, causes and effects of power quality issues, electrical systems and their measures and mitigation	K2
C314.2	**Analyze** the causes & Mitigation techniques of various PQ events.	K4
C314.3	**Study** about the various Active & Passive power filters and understand the concepts about Voltage and current distortions, harmonics.	K2
C314.4	**Analyze** and design the passive filters	K4
C314.5	**Understand** knowledge on compensation techniques and DVR	K2

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COURSE CODE & NAME : C315 & POWER ELECTRONICS AND DRIVES LABORATORY		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C315.1	**Demonstrate** the gate pulse generation using various configurations.	K2
C315.2	**Analyze** the characteristics of SCR, TRIAC, MOSFET & IGBT.	K4
C315.3	**Analyze** the performance parameters of DC – AC, DC – DC converter circuits.	K4
C315.4	**Analyze** the performance of AC – DC, AC – AC converter circuits.	K4
C315.5	**Simulate** of various power electronic converter circuits.	K3

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COURSE CODE & NAME : C316 & MICROPROCESSORS AND MICROCONTROLLERS LABORATORY		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C316.1	**Apply** the arithmetic operations, logic operations and sorting using 8085 microprocessors.	K3
C316.2	**Analyze** the program for ADC, DAC conversion, finding the maximum and minimum numbers in a series.	K4
C316.3	**Analyze** the operations of peripheral interfacing with 8085 microprocessors	K4
C316.4	**Apply** the arithmetic, logic operations and branching operation using 8051 microcontrollers	K3
C316.5	**Apply** the program for peripheral interfacing with 8051 microcontrollers.	K3

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COURSE CODE & NAME : C317 & MINI PROJECT		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C317.1	**Apply** the fundamental knowledge within the technical area to a given problem, analyze previous researcher's work.	K3
C317.2	**Analyze** the engineering solutions to complex problems and conduct experiments.	K4
C317.3	**Apply** appropriate technology tools for communication, teamwork, conclusion support and attitudes of a professional engineer.	K3
C317.4	**Interact** with team members in a qualified manner, to ensure a collective project environment and also apply a strong working knowledge of ethics.	K3
C317.5	**Document** and present one's own work for a given target group with good oral and written presentation skills and also recognize the need for life-long learning by undergoing the project work	K3

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COURSE CODE & NAME : C401 & HIGH VOLTAGE ENGINEERING		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C401.1	**Understand** the overvoltage causes, effects & protection in power system.	K2
C401.2	**Describe** the various dielectric breakdown mechanism	K2
C401.3	**Understand** the various types of generating for HVAC and HVDC.	K2
C401.4	**Explore** the different overvoltage AC and DC measuring at appropriate method	K2
C401.5	**Apply** the fundamental of test for transformer, insulator, CB and electrical apparatus.	K3

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COURSE CODE & NAME : C402 & POWER SYSTEM OPERATION AND CONTROL		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C402.1	**Apply** the fundamental structure and operation of power system	K3
C402.2	**Apply** the power frequency controller design for single and two area system.	K3
C402.3	**Analyze** the reactive power control and maintain the voltage profile for varying the load.	K4
C402.4	**Analyze** and **apply** the unit commitment and economic dispatch problem.	K4
C402.5	**Understand** the computer control and its real time applications.	K2

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COURSE CODE & NAME : C403 & RENEWABLE ENERGY SYSTEMS		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C403.1	**Explain** the environment aspect, awareness and to get acceptable inputs about renewable Energy resources and technologies.	K2
C403.2	**Describe** the working of various types of wind energy conversion system.	K2
C403.3	**Discuss** the solar energy conversion system and different types of solar plants system.	K2
C403.4	**Understand** the basic of energy conversion system like Hydro, biomass and Geothermal power plants.	K2
C403.5	**Explain** the basic of various renewable energy resources and technologies and their applications.	K2

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COURSE CODE & NAME : C404 & DISASTER MANAGEMENT		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C404.1	**Exposure** to disasters, their significance and types.	K2
C404.2	**Understand** the relationship between vulnerability, disasters, disaster prevention and risk reduction	K2
C404.3	**Understanding** of approaches of Disaster Risk Reduction (DRR)	K2
C404.4	**Enhance** awareness of institutional processes in the country	K4
C404.5	**Develop** rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity	K5

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COURSE CODE & NAME : C405 & INTRODUCTION TO C PROGRAMMING		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C405.1	**Develop** simple applications using basic constructs	K5
C405.2	**Develop** applications using arrays	K5
C405.3	**Develop** applications using strings	K5
C405.4	**Develop** applications using functions	K5
C405.5	**Develop** applications using structures	K5

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COURSE CODE & NAME : C406 & POWER SYSTEMS TRANSIENTS		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C406.1	**Comprehend** the importance of transients and its effect on power system.	K2
C406.2	**Understand** the overvoltage due to switching transients.	K2
C406.3	**Discuss** the importance of lighting transients and its interaction with power system.	K2
C406.4	**Understand** the traveling waves concepts in transmission line.	K2
C406.5	**Comprehend** the integrated power system using qualitative application of EMTP for transient computation.	K2

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COURSE CODE & NAME : C407 & POWER SYSTEM SIMULATION LABORATORY		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C407.1	**Analyze** the appropriate program for transmission line parameters and its performance	K4
C407.2	**Formulate** the bus admittance and impedance matrices and derive the solution for electrical network problems	K5
C407.3	**Analyze** the fault analysis for a given power system under symmetrical and unsymmetrical fault.	K4
C407.4	**Analyze** the stability of the power system by simulation using appropriate techniques	K4
C407.5	**Formulate** a suitable program to solve economic dispatch problem and load frequency dynamics of interconnected power system.	K5

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COURSE CODE & NAME : C408 & RENEWABLE ENERGY SYSTEMS LABORATORY		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C408.1	**Analyze** the concept of renewable energy resources and technologies.	K4
C408.2	**Analyze** the characteristics of solar PV and wind energy system	K4
C408.3	**Evaluate** the performance of micro wind generation and Hybrid systems.	K5
C408.4	**Analyze** the simulation technique in solar PV system, wind and hybrid energy systems.	K4
C408.5	**Analyze** the importance of intelligent controllers for hybrid energy generation systems.	K4

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COURSE CODE & NAME : C409 & PRINCIPLES OF MANAGEMENT		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C409.1	**Understand** the definition of management, evolution of management, types of business organization and role of managers in a business.	K2
C409.2	**Know and understand** the planning strategy, setting an objective oriented planning, tools and techniques applied for planning and	K2
C409.3	**Understand** the organization structure, roles, delegation of authority. Understand the human resource planning, recruitment process,	K2
C409.4	**Understand** the importance of directing workforce, motivation to employees, job enrichment, essentials of communication between entities	K2
C409.5	**Understand** and generate budget controls, productivity improvement and control framework for achieving the above objectives.	K2

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COURSE CODE & NAME : C410 & BIOMEDICAL INSTRUMENTATION		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C410.1	**Understand** the philosophy of the heart, lung, blood circulation and respiration system.	K2
C410.2	**Provide** latest ideas on devices of non-electrical device and ability to gain knowledge on various sensing and measurement devices of electrical origin.	K2
C410.3	**Understand** the analysis systems of various organ types.	K3
C410.4	**Bring out** the important and modern methods of imaging techniques and their analysis.	K4
C410.5	**Explain** the medical assistance/techniques, robotic and therapeutic equipments	K4

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COURSE CODE & NAME : C411 & PROJECT WORK		
Code	**Course Outcome** (On Successful completion of the course, Students will be able to)	**K- Level**
C411.1	**Develop** the ability to solve a specific problem right from its identification and literature review till the successful solution of the same.	K6
C411.2	**Analyze** a new method to solve the related problems	K4
C411.3	**Apply** the fundamental engineering knowledge & skills to solving the problem.	K3
C411.4	**Agree** and work as a team to come to a common conclusion	K5
C411.5	**Design** engineering solutions to complex problems in a systematic approach	K6